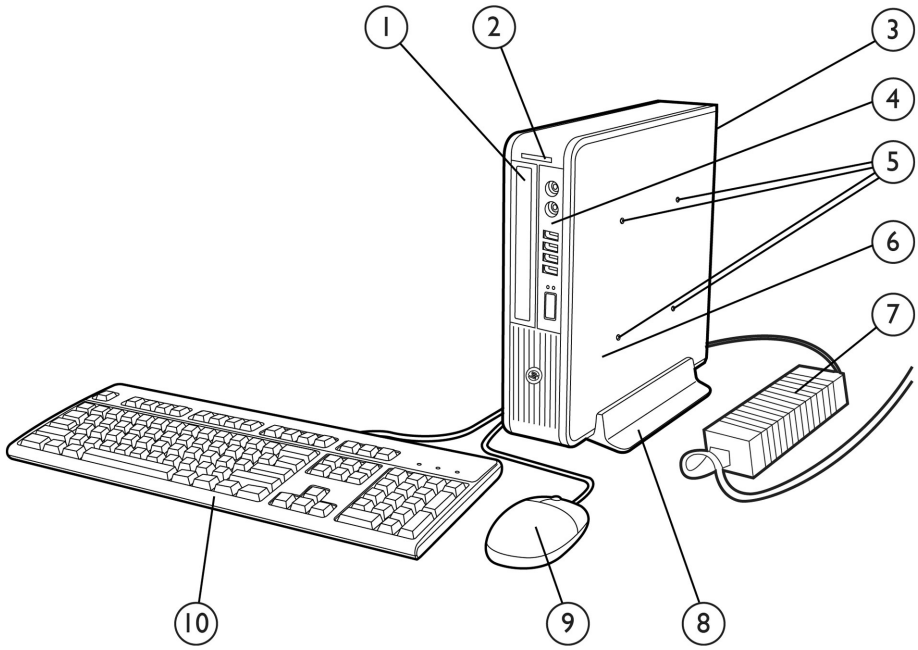
HP SignagePlayer mp8200 and mp8200s



1. Optical DVD-ROM Drive
2. Secure Digital (SD) Card Reader
3. Rear I/O includes (6) USB 2.0 ports, DisplayPort v1.1a and VGA video interfaces, PS/2 mouse and keyboard ports, RJ-45 network interface, 3.5mm audio in/out jacks
4. Front I/O includes (4) USB 2.0 ports, audio out , and a microphone/headphone jack
5. 100mm VESA mounting holes
6. 2.5" internal hard disk drive bay
7. 135W 87% efficient external Power Adapter or
   180W 87% efficient external Power Adapter (when configured with discrete graphics)
8. HP USDT Tower Stand (optional)
9. HP Mouse (optional)
10. HP Keyboard (optional)

Overview

At A Glance

- PC chassis and all internal components and modules are 100% free of brominated flame retardants (BFRs) and Polyvinyl Chloride (PVC).
- UEFI BIOS developed and engineered by HP for better security, manageability and software image stability
- Intel Q67 Express chipset supporting Intel 2nd generation Core processors, featuring Intel HD Graphics and with vPro Technology (available with select processors on Windows Embedded Standard 7)
- Intel 82579LM GbE integrated network connection
- DDR3 Synchronous Dynamic Random Access Memory (SDRAM)
- Integrated dual independent monitor support via VGA and digital DisplayPort v1.1a video interfaces (dual monitor support is not supported on the mp8200s using Scala Quickstart)
- Discrete graphics options available 87% efficient energy saving external power adapter standard with USDT models
- Guaranteed lengthy purchase lifecycles Created using industry leading Design for Environment standards
- Tool-less serviceability features for easier upgrades and repairs

Standard Features and Configurable Components (availability may vary by country)

Operating Systems

Preinstalled

Genuine Windows Embedded Standard 2009[1]

Genuine Windows Embedded Standard 7[2]

[1] mp8200s model

[2] mp8200 model

Value Added Software (included on mp8200s)

Scala Quickstart

HP Business PC Services and Feature

HP Stable Platform Program

Intel Stable Platform Program

Business-to-Business Portals

HP Global Series Services

Factory Express Deployment and Lifecycle Services

Intel Core vPro Processors

Trusted Platform Module (TPM v1.2) *

* TPM module disabled where restricted by law, i.e. Russia.

Service and Support

On-site warranty and service[1]: This limited warranty and service offering delivers parts, labor and on-site repair for terms up to 5 years. Response time is next business day[2] and includes free telephone support[3] 24 x 7. Global coverage[2] ensures any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.

[1] Terms and conditions may vary by country. Certain restrictions and exclusions apply

[2] On-site services may be provided pursuant to a service contract between HP and an authorized HP third party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country

[3] Technical telephone support applies only to HP configured, HP and HP qualified third party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

Chipset

	mp8200	mp8200s
Intel Q67 Express	X	X

Standard Features and Configurable Components (availability may vary by country)

Processor	mp8200	mp8200s
Intel® 2nd Generation Core™ i3 Processors		
Intel Core i3-2100 Processor 3.10 GHz, 3M cache, 2 cores/4 threads	X	X
Intel® 2nd Generation Core™ i5 Processors		
Intel Core i5-2400S Processor 2.50 GHz, 6M cache, 4 cores/4 threads Intel Stable Image Platform Program (SIPP) Supports Intel vPro Technology	X	X

Intel 2nd Generation Core vPro Processors

All HP SignagePlayer mp8200 Series models featuring this technology include processors that are part of the Intel 2011 Stable Image Platform Program (SIPP) designed to ensure the stability promise inherent in the value proposition of the HP SignagePlayer mp8200 Series, thus making these models the most stable, secure, and manageable platforms available to enterprises today.

Intel Advanced Management Technology (AMT) v7.0 - An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 7.0 includes the following advanced management functions:

- Power Management (on, off, reset)
- Hardware Inventory (includes BIOS and firmware revisions)
- Hardware Alerting
- Agent Presence
- System Defense Filters
- SOL/IDER
- Cisco NAC/SDN Support
- ME Wake-on-LAN
- DASH 1.1 compliance
- IPv6 Support
- Fast Call for Help - a client inside or outside the firewall may initiate a call for help via BIOS screen, periodic connections, or alert triggered connection
- Remote Scheduled Maintenance - pre-schedule when the PC connects to the IT or service provider console for maintenance. Remote PCs can get required patches, be inventoried, etc by connecting to their IT console or Service Provider when it's convenient
- Remote Alerts - automatically alert IT or service provider if issues arise
- Access Monitor - Provides oversight into Intel® AMT actions to support security requirements
- PC Alarm Clock
- Microsoft NAP Support
- Host Base set-up and configuration
- Management Engine (ME) firmware roll back
- Wireless AMT functionality on Desktop (WoDT)
- Enhanced KVM resolution

Standard Features and Configurable Components (availability may vary by country)

System Memory Support

The HP SignagePlayer mp8200 Series supports the 2nd generation Intel® Core™ processor family. Based on a new PC micro-architecture, the processor is designed for a two-chip platform consisting of a processor and Platform Controller Hub (PCH). Unlike previous generations, the processor includes an integrated memory controller (IMC). The IMC supports DDR3 protocols with two independent, 64-bit wide channels each accessing one or two DIMMs.

- Two channels of non-ECC unbuffered DDR3 memory with a maximum of two UDIMMs or SODIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- DDR3 memory data transfer rates of 1066 MT/s (PC3-8500) and 1333 MT/s (PC3-10600)
- 64-bit wide channels
- DDR3 I/O voltage of 1.5V
- Maximum memory bandwidth of 10.6 GB/s in single-channel mode or 21 GB/s in dual-channel mode assuming DDR3 1333 MT/s (PC3-10600)
- 1GB and 2GB DDR3 DRAM technologies are supported. Using 4 GB device technologies, the largest memory capacity possible is 32 GB, assuming dual channel mode with four x 8 GB dual ranked unbuffered DIMM memory configuration.

CAUTION: You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

Memory Configurations:

Upgradeable to 4 GB. Slot 1 is black and must always be populated. Not all memory configurations possible are represented below.

Total Memory	Socket	
	Channel A (black)	Channel B (black)
2 GB (dual channel)	1 GB	1 GB
4 GB (dual channel)	2 GB	2 GB

NOTE:
For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. The mp8200s hardware and BIOS supports up to 4GB however a maximum of 2GB is available to the operating system.

NOTE:
The Intel Q67 Express chipset includes a built-in Management Engine (ME), which allocates memory for manageability functions. Management Engine memory is shared with system memory. If the PC contains a single SO-DIMM, 16 MB of memory is pre-allocated for it at system startup. If the PC contains two SO-DIMMs, 32 MB of memory is pre-allocated. This memory is not made available to the operating system, just as pre-allocated video memory is not available.

Storage

mp8200s and mp8200

(waiting for image)

Standard Features and Configurable Components (availability may vary by country)

Storage Drive Support

	SDR	ODD	HDD		
Quantity Supported	0	1	1	0	1
Position	1	2	3		

Data Storage Drives

	mp8200	mp8200s
160-GB Hard Disk Drives		
HP 160GB 7.2K rpm SATA 3.0Gb/s 2.5" Hard Disk Drive	X	X
Solid State Drives		
HP 160-GB SATA 3.0Gb/s Solid State Drive	X	X
Optical Disc Drives		
HP Slim DVD-ROM Drive[1]	X	

Security Solutions and Capabilities

	mp8200	mp8200s
Trusted Platform Module (TPM) 1.2[1]	X	X
Stringent security (via BIOS)[2]	X	X
SATA port disablement (via BIOS)	X	X
Drive lock	X	X
Serial, parallel, USB enable/disable (via BIOS)	X	X
Removable media write/boot control	X	X
Power-On password (via BIOS)	X	X
Setup password (via BIOS)	X	X
HP Hood Sensor	X	
Support for chassis padlocks and cable lock devices	X	X

[1] TPM module disabled where use is restricted by law; for example, Russia.
[2] This setting is defaulted to disable, but when enabled, the PW jumper will not clear the BIOS pre-boot authentication passwords.

Network Interface Connections

	mp8200	mp8200s
Intel 82579LM integrated GbE Network Connection	X	X
Intel Centrino Advanced-N 6205 Wireless NIC (mini PCI Express)	X	X

NOTE: Either the integrated network connection or the Intel Centrino wireless NIC is required to support Intel vPro Technology features on the mp8200 model.

Standard Features and Configurable Components (availability may vary by country)

Graphics	mp8200	mp8200s
Intel HD Graphics 2000/3000 (integrated)	X	X
ATI Radeon HD 5450 Graphics (MXM)	X	X
HP DisplayPort Cable	X	X
HP DisplayPort to DVI-D Adapter	X	X
HP DisplayPort to HDMI Adapter	X	X
HP DisplayPort to VGA Adapter	X	X

Multi-Media	mp8200	mp8200s
High Definition Audio with Realtek ALC261 codec (all ports are stereo)	X	X
Microphone/Headphone* and dedicated headphone front ports (3.5mm)	X	X
Line-out and Line-In rear Ports* (3.5mm)	X	X
Internal Speaker (standard)	X	X

Input/Output Devices	mp8200	mp8200s
HP USB Standard Keyboard	X	X

Miscellaneous Devices and Configurations	mp8200	mp8200s
HP USDT Tower Stand	X	X

After-Market Options (availability may vary by country)

Graphics	mp8200	mp8200s	Part #
HP DisplayPort Cable Kit	X	X	VN567AA
HP DisplayPort To DVI-D Adapter	X	X	FH973AA
HP DisplayPort to HDMI Adapter	X	X	BP937AA
HP DisplayPort to VGA Adapter	X	X	AS615AA

Data Storage Drives and Accessories	mp8200	mp8200s	Part #
HP 160-GB SATA 3.0Gb/s Solid State Drive	X	X	BW321AA

Input Devices	mp8200	mp8200s	Part Number
HP USB Standard Keyboard	X	X	DT528A
HP USB Optical Mouse	X	X	DC172AT

System Memory	mp8200	mp8200s	Part Number
HP 1 GB SO-DIMM	X	X	VH639AA
HP 2 GB SO-DIMM	X	X	VH640AT

Multi-Media Devices	mp8200	mp8200s	Part Number
HP Slim DVD-ROM Drive	X		VP033AA

Security Devices	mp8200	mp8200s	Part Number
HP Business PC Security Lock	X	X	PV606AA
HP USDT Rear Port Controller Cover	X	X	VN571AA
HP Keyed Lock Cable	X	X	BV411AA

Stands and Accessories	mp8200	mp8200s	Part Number
HP USDT Tower Stand	X	X	VN568AA

Weights & Dimensions (configured with 1 HDD and 1 ODD)	mp8200 and mp8200s
Chassis (without stand) (H x W x D)	2.6 x 9.9 x 10 in 66 x 252 x 254 mm
System Volume	257.5 cu in 4.2 L
Tower Stand (H x W x D)	1.1 x 4.9 x 6.7 in 27 x 125 x 170 mm
Packaging (H x W x D)	8.6 x 15.7 x 19.7 in 218 x 398 x 500 mm
System Weight*	6.8 lb 3.1 kg
Shipping Weight*	14.4 lb 6.5 kg
Max Supported Weight (desktop orientation)	77.0 lb 35.0 kg

I/O Ports	mp8200 and mp8200s
USB 2.0	Front - four (4) ports Rear - six (6) ports
PS/2	color coded support for keyboard (purple) and mouse (green)
Video	VGA and DisplayPort v1.1a provide integrated dual independent monitor support
DVI output	available via optional DisplayPort to DVI Adapter
Audio	Front - microphone & headphone Rear - line input (supports microphone or line input), line out All ports are 3.5mm in diameter NOTE: See Audio/Visual section for information on re-taskable audio ports.
NIC	Industry standard RJ-45 port accesses the integrated network interface controller

Slots	mp8200 and mp8200s
Mini PCI Express	1 each
MXM	1 each

Bays	mp8200 and mp8200s
Slim	1 each
Internal HDD Bays	1 each 2.5" drives

Technical Specifications

Controller	mp8200 and mp8200s
Hard Drive Controller	1 each
Host SATA Controller	Advanced Host Controller Interface (AHCI) Revision 1.2. The specification includes a description of the hardware/software interface between system software and the host controller hardware.[1]

[1] The mp8200s model ships with the SATA controller in IDE mode

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F(-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)

* Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

Power Supply	mp8200 and mp8200s	
Standard Efficiency	N/A	
High Efficiency	Integrated graphics:	135W active PFC 87% efficient
	Discrete graphics:	180W active PFC 87% efficient
Operating Voltage Range	90 - 264 VAC	
Rated Voltage Range	100 - 240 VAC	
Rated Line Frequency	50/60 Hz	
Operating Line Frequency Range	47 - 63 Hz	
Rated Input Current	N/A	
Rated Input Current with Energy Efficient* Power Supply	135W: 2.4A 180W: 2.9A	
Current Leakage (NFPA 99)	< 250 μA	

Power Supply Fan	N/A
Power Cord Length	N/A
External Power Adapter	
Dimensions	6.7 x 2.6 x 1.5 in
Total Cord Length	12 ft 8 in

ROM BIOS Information

Key features of the HP BIOS include:

- Deployment and manageability - HP BIOS provides several technologies that help integrate the HP SignagePlayer 8200 Series into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Select models feature either Intel Standard Manageability or Intel Core vPro Processor Technology.
- Stability - HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Support UEFI specification 2.1
- Thermal and power management - The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance - Industry leading acoustic emissions across the range of operating conditions.
- Serviceability - HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery - HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows (HPQFlash), HP Client Manager, and fail-safe recovery. In addition, the HP Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS Features

- Power-On password - Helps prevent an unauthorized user from powering on the system.
- Administrator password - Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) - Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Elite models use ACPI to provide power conservation features.
  S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W is S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.

Other Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- System Management BIOS v2.6
- Intel Wired for Management support; industry wide initiative to make Intel architecture based PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
    - 2 - processor thermal protection activated
    - 3 - processor not installed
    - 4 - power supply failure
    - 5 - memory error
    - 6 - video error
    - 7 - PCA failure (ROM detected failure prior to video)
    - 8 - invalid ROM, bootblock recovery mode
    - 9 - system not fetching code
    - 10 - system hang while loading an option ROM
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs, and Quick Release Latches for easy Identification

Additional Features	Description
Towerable Orientation	Product can be oriented as either a desktop or a tower
Drive Lock	Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.
Drive Protection System	DPS Access through F10 Setup during Boot A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced

	The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures
SMART Technology (Self-Monitoring, Analysis and Reporting Technology) SMART I - Drive Failure Prediction SMART II - Off-Line Data Collection SMART III - Off-Line Read Scanning with Defect Reallocation SMART IV - End-to-End CRC for hard drives	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure IOEDC: I/O Error Detection Circuitry Detects errors in Read/Write buffers on HDD cache RAM Interface in F10 setup provides confirmation of SMART IV support.

High Definition Audio

Type	Integrated
HD Stereo Codec	Realtek 2-channel ALC261 codec
Audio I/O Ports	Front microphone-In (150-K ohm Input Impedance) Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) Rear Line-Out* (190 ohms Output Impedance, expects at least a 10-K ohm load) Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. All ports are 3.5 mm
Internal Speaker Amplifier	1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.
Multi-streaming Capable	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
Sampling	8 kHz - 192 kHz
Wavetable Syntheses	Yes - Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out	Stereo (Left & Right channels)
Internal Speaker	Yes
External Speaker Jack	Yes

Intel 82579LM GbE Network Connection (integrated)

Connector	RJ-45
System Interface	Integrated on PCA
Controller	Intel 82579LM GbE platform LAN connect networking controller
Memory	24 KB FIFO packet buffer memory
Data rates supported	10/100/1000 Mbps
IEEE Compliance	802.1P 802.1Q 802.2 802.3 802.3ab 802.3az 802.3u
Bus architecture	PCI Express and SMBus
Data transfer mode	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
Power requirement	Requires 3.3V and 1.05V or just 3.3V with integrated regulators Power consumption 0.697 Watts
Boot ROM support	Yes
Network transfer mode	Full-duplex Half-duplex (not supported for the 1000BASE-T transceiver)
Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
Environmental	Operating Temperature: 0° to 85° C Operating Humidity: 60% RH
Management	WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic.
Alerting	ASF 2.0 support; AMT 7.0 support

Intel Centrino Advance-N 6205 Wireless Network Interface Connection

Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
Interoperability	Supports Intel Core vPro Processor Technologies Cisco Compatible Extensions Program compliant (802.11a/b/g only) with Microsoft Windows XP, Windows Vista and Windows 7
Frequency Band	2.4 GHz and 5 GHz
Antenna Structure	2 transmit; 2 receive (2x2)

Technical Specifications - Communications

Data Rates	802.11b: 1, 2, 5.5, 6, 9, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: ranging from 6 Mbps to 300 Mbps, depending on the combination of Bandwidth, Modulation Coding Scheme, and Guard Interval used, as defined in IEEE 802.11n specification
Modulation	Direct Sequence Spread Spectrum DBPSK, DQPSK, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM
Security	Supports 64- and 128-bit WEP, WPA, WPA2, hardware-accelerated AES (support for key sizes of 128, 192, and 256 bits), 802.1x authentication types EAP-TLS, EAP-TTLS, PEAP-GTC, PEAP-MSCHAPv2, LEAP, EAP-FAST. Support for Cisco Security Features (proven compatibility with Cisco Aironet infrastructure products through the Cisco Compatible Extensions Program Version 4) with Microsoft Windows Vista and XP only.
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Media Access Protocol	CSMA/CA (Collision Avoidance) with ACK
Network Architecture	Ad-hoc (Peer to Peer)
Models	Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power (for CCK)	15 dBm
Output Power (for OFDM; power varies by data rate)	15 dBm
Power Consumption	Transmit: 2.3 Watts (average, with one spatial streams) Receive: 1.9 Watts (average with two receive chains) Idle mode: 30mW - 40mW (average) Radio off: 20 mW (max)
Power Management	ACPI compliant power management 802.11 compliant power saving mode
Antenna Connections	3 U.FL type connectors, 50 ohm nominal impedance
Range	802.11 a - Typical (@6 Mbps): 600 feet - Outdoor Open Area; 150 feet - Indoor, Office environment 802.11 b - Typical (@1 Mbps): 1200 feet - Outdoor Open Area; 300 feet - Indoor, Office environment 802.11 g - Typical (@1 Mbps): 1200 feet - Outdoor Open Area; 300 feet - Indoor, Office environment
Form Factor	MiniPCI-Express
Weight	0.013 lb (4.0 g)
Dimensions	1.1 x 1.2 in (26.8 x 30.0 mm)
Operating Voltage	3.3V +/- 9%, 1.5V +/- 5%
Temperature	Operating: 32° to 176° F (0° to 80° C) Non-operating: -40° to 176° F (-40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 90% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)

Intel HD Graphics

3D/2D Controller	Microsoft DirectX 10.1 based with support for Pixel Shader 4.1
VGA Controller	Integrated
DisplayPort	v1.1a; integrated, multimode capable; supports HDCP and audio over DisplayPort
Bus Type	PCI Express™ x16
RAMDAC	Integrated, 350 MHz
Memory	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.
HW Video Decode	Hardware Accelerated decode for MPEG2 encrypted video; support for PAVP
Maximum Color Depth	32 bits/pixel
Multi-display Support	Integrated dual independent monitor support facilitated via one VGA port and one DisplayPort v1.1a integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. Support for DVI, HDMI, dual link DVI or second VGA monitor provided by optional HP DisplayPort adapters. (see complete listing of available optional adapters elsewhere in this QuickSpec). The system can support greater than two monitors with the addition of an optional discrete graphics card. Both integrated graphics and discrete graphics can be utilized simultaneously.
Graphics/Video API Support	DirectX 10.1 support in hardware OpenGL 3.0 support in hardware
Resolutions Supported	Display Resolutions and Refresh Rates NOTE: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Analog	Digital
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a DisplayPort connection
NOTE: other resolutions may be available but are not recommended as the may not have been tested and qualified by HP
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

AMD Radeon HD 5450 Graphics Card

Form Factor	MXM 3.0 A
Engine Clock	650 MHz
Memory Type	DDR3
Memory Data Rate	800 MHz
Memory Size (width)	512 MB (64 bit)
3D API support	DX11, SM 5
LVDS support	Yes
DisplayPort	1.1a
HDCP support	yes
HDMI support	1.3 compatible
BD support	• Full rate playback @ max. resolution of display • Full sub-video support w/o frame drops • Full BDJ or iHD support w/o frame drops
Total Power Consumption	25W

HP DisplayPort to DVI-D Adapter

Connectors	DisplayPort and DVI-D single link connector
Adapter length	7.5 in (19.0 cm)
Adapter weight	.10 lbs (.05 kg)

HP DisplayPort to VGA Adapter

Connectors	DisplayPort and VGA connector
Adapter length	8 in (20 cm)
Adapter weight	.1 lbs (.06 kg)
Maximum vertical refresh rate	85 Hz
Display support	162 MHz RAMDAC
Display max resolution	1600x1200

Technical Specifications - Graphics

	Resolution	Max refresh rate
Resolutions Supported	640x480	85
	800x600	85
	1024x768	85
	1280x720	85
	1280x1024	85
	1440x900	75
	1600x1200	60
	1680x1050	60
	1920x1080	60-R
	1920x1200	60-R

NOTE: Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP. Using the HP DisplayPort to VGA Adapter may require an update to the graphics driver installed on your system. To install the most up-to-date graphics driver go to: www.hp.com.

NOTE: 60-R denotes reduced blanking timings are used. Not all monitors support reduced blanking timing.

Introduction:

HP Serial Advanced Technology Attachment (SATA) Hard Drives maximize the performance of HP Business PCs by providing the technologies to meet your increasing storage demands with high-capacity drives offering superior reliability and performance.

SATA provides faster data transfer speeds, better system cooling airflow, more bandwidth, more headroom for speed increases in future generations and better data integrity. A next-generation technology, the SATA interface connects hard drives to the PC platform enabling easy aggregation of multiple hard drives into a single PC. This offers you the additional benefits of dedicated bandwidth, the ability to more easily identify device failures and scalability. The HP SignagePlayer mp8200 Elite Series supports the latest SATA 6.0Gb/s specification.

HP Drive Lock

HP Serial ATA Hard Drives offer enhanced security via a new Drive Lock. When enabled, this ATA security feature set prevents software access to user data on the drive until one or two user-defined passwords are provided.

SMART IV Technology

Self Monitoring Analysis and Reporting Technology (SMART) hard drive technology allows hard drives to monitor their own health and to raise flags if imminent failures are predicted. If the drive determines that a failure is imminent, the SMART hard drive technology enables the intelligent manageability or management software to generate a fault alert. While the current versions of SMART hard drives do a good job monitoring the data on the hard drive media, the ever increasing emphasis on reliability and quality has promoted HP to implement SMART IV technology which constantly checks that the data flow from host interface to media and media to host interface is not compromised. This is accomplished by inserting a 2 byte parity code into every 512 byte block in the data path of the hard drive's Cache RAM. This unique parity checking performed by HP's SMART IV technology hard drives, allows for more complete error detection coverage encompassing the entire data path between the host and the hard drive.

Smart IV is also known as IOEDC: I/O Error Detection Code.

Native Command Queuing

NCQ or Native Command Queuing is a SATA protocol extension that allows the hard drive to have several write or read commands outstanding at the same time. In contrast, normal non-queued operation requires each command to be completed before the next command is issued by the host system. Queuing allows the drive to complete the commands in the order that allows for best overall throughput. It also involves an advanced method of transferring data to or from the host, called First Party Direct Memory Access (FPDMA), which allows the hard drive and the host controller to manage the data transfers for multiple outstanding commands, without involving the host processor. NCQ can contribute to better performance but the results are dependent on many factors, including the access patterns of the various applications and operating system functions that are initiating drive accesses. Enabling NCQ features in the hard drive requires AHCI support from the host system BIOS, controller, and driver. AHCI support is typically implemented in RAID configurations.

NOTE: GB = 1 billion bytes. Actual available capacity is less.

Technical Specifications – Data Storage

HP 160-GB Solid State Drive

Unformatted Capacity	160 GB	
Architecture	Multi Level Cell (MLC) NAND Flash with wear leveling 10 channel controller	
Interface	Serial ATA 2.0 (3.0 Gb/s)	
Dimensions (W x H x D)	2.74 x 0.37 x 4 in (6.98 x 0.95 x 10.2 cm)	
Weight	0.18 lb (80 g)	
Bandwidth Performance	Sustained Sequential Read:	Up to 250 MB/s
	Sustained Sequential Write:	Up to 70 MB/s
	Random Read:	Up to 35K IOPs
	Random Write:	Up to 6.6K IOPs
Latency	Read:	65-ms
	Write:	85-ms
Power	DC power requirement:	5 VDC 5%-100 mV ripple p-p
	Total power consumption:	0.15W (active); 0.075W (idle)
Useful Drive Life	35TB written, up to 20GB/day for 5 years	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Maximum Wet Bulb Temperature (operating):	84° F (29° C)
	Shock:	1,500 G/0.5-ms

NOTE: For solid state disk drives, GB means 1 billion bytes. 16GB is the unformatted capacity of this drive before a portion of the drive is reserved for flash management features. Actual capacity varies by content and will be less than 15.8GB.

HP 160-GB 7.2K SATA 3.0Gb/s 2.5" Hard Disk Drive

Capacity	160,041,885,696 bytes	
Rotational Speed	7,200 rpm	
Interface	Serial ATA 2.0 (3.0 Gb/s)	
Buffer Size	16 MB	
Logical Blocks	312,581,808	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	12 ms
	Full-Stroke:	22 ms
Height (nominal)	0.374 in/9.5 mm	
Width (nominal)	Media diameter: 2.5 in/63.5 mm	
	Physical size: 2.75 in/70 mm	
Operating Temperature	41° to 131° F (5° to 55° C)	

HP USB Standard Keyboard

Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg)
Electrical	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
Mechanical	Languages	38 available
	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
Kit contents	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

Technical Specifications - Removable Storage

HP Slim DVD-ROM Drive

AMO Part Number	VP033AA	
Height	12.7mm	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Dimensions (W x H x D)	5.0 x 0.5 x 5.0 in (128 x 13.6 x 129 mm)	
Weight (max)	0.42 lb (190 g)	
Read speeds	DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 4X
	DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
Access time (typical reads, including settling)	Random DVD	DVD: < 140 ms (typical), CD: < 125 ms (typical)
	Random CD	DVD: < 250 ms (seek), CD: < 210 ms (seek)
	Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s)
Power	Source	Four-pin, DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum
	Total Drive Power (standby mode)	< 2.5 Watt
Audio output	Line-Out	0.7 VRMS
	Signal-to-Noise Ratio	74 dB
	Channel Separation	65 dB
Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	5% to 85%
	Maximum Wet Bulb Temperature (operating)	86° F (30° C)

Technical Specifications - Eco Data

Eco-Label Certifications & declarations This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration

mp8200 and mp8200s models

Energy Consumption (typically configured)	115 VAC	230 VAC	100 VAC
Normal Operation	18.95 W	20.01 W	18.66 W
Sleep State	2.09 W	2.182 W	2.099 W
Off	1.128 W	1.228 W	1.127 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	65 BTU/hr	68 BTU/hr	64 BTU/hr
Sleep State	7 BTU/hr	7 BTU/hr	7 BTU/hr
Off	4 BTU/hr	4 BTU/hr	4 BTU/hr

*Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.7	28
Fixed Disk (random writes)	3.9	28

Battery The battery(s) in this product complies with EU Directive 2006/66/EC, and does not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight

Battery Size CR2032 (coin cell)

Battery Type Lithium

Additional Information This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0.03% post-consumer recycled plastic (by wt.)

This product is 92.2% recyclable when properly disposed of at end of life.

Technical Specifications - Eco Data

Packaging Materials	External	Corrugated Carton - 1526.2 g
	Internal	Polyethylene low density foam - 177 g

The corrugated packaging material contains at least 49.42 % recycled content.

The Polyethylene low density Foam packaging material contains at least 60.42% recycled content.

All Models

Reduction in Hazardous Substances (RoHS) Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at: http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 micro-grams/cm ^ 2/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

Packaging

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.

Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

Technical Specifications - Eco Data

End of Life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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